Dr. Kyle Dawson
The University of Utah
115 S 1400 E Rm. 201
Salt Lake City, UT 84112

Dear Dr. Dawson,

The National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA) request that the Astronomy and Astrophysics Advisory Committee (AAAC) establish an ad hoc taskforce as part of an effort by the agencies to address the 2020 Decadal Survey on Astronomy and Astrophysics (Astro2020) Recommendation on laboratory astrophysics. [1]

Background

Recognizing that laboratory astrophysics is essential "*for enabling science across astrophysics*" and "*to realize the full potential of recent and imminent major observatories,*" the Astro2020 Report concludes that supporting research in laboratory astrophysics "be regarded as a high priority," and that "the existing approaches are not sufficiently advancing the field." Accordingly, the Report made the following multi-pronged Recommendation:[2]

NASA and the National Science Foundation should (1) convene a broad panel of experts to identify the needs for supporting laboratory data to interpret the results from the new generation of astronomical observatories, (2) identify the national resources that can be brought to bear to satisfy those needs, and (3) consider new approaches or programs for building the requisite databases. This panel should include experts in laboratory astrophysics as well as representative users of the data, who can best identify the highest-priority applications.

The 2021-2022 AAAC report[3] reiterated the Astro2020 Recommendation, adding:

"Although all three agencies have laboratory astrophysics programs, their strategic alignment with national priorities and the community that they serve must be assessed. To this end, the AAAC recommends that an advisory group to NASA, NSF, and DOE be established to identify strategic and community needs, and to set priorities in laboratory astrophysics."

While the Astro2020 report includes suggestions on actions that can be taken to strengthen laboratory astrophysics, what is needed is a robust assessment of the field with focused input from observational, theoretical, and laboratory astrophysics communities. This will allow the

[1]https://www.nationalacademies.org/our-work/decadal-survey-on-astronomy-and-astrophysics-2020-astro2020
[2]See chapter 4.5.5 of the Astro2020 report
[3]https://www.nsf.gov/mps/ast/aaac/reports/annual/aaac_2022_report.pdf

agencies to identify the most impactful ways to enhance the scientific return of observatories and missions by supporting the laboratory astrophysics community.

Charge and Purpose

The ad hoc Taskforce is asked to develop an assessment of the scientific utility and priorities in laboratory astrophysics for the US community that will enable the greatest advances in astrophysics. The purpose is to allow the agencies to devise a robust plan to make the most effective use of available resources to enable discovery science by supporting the community.

Comprised of laboratory astrophysicists, theorists, and database curators, as well as observational astronomers and modelers who rely on laboratory astrophysics, the ad hoc Taskforce is asked to:

- **Survey the current state of laboratory astrophysics, drawing from the wide range of available materials (e.g., Decadal Survey reports, white papers, community workshop reports, etc.)**
  - Assess resources that currently support laboratory astrophysics, including grant programs, databases, facilities, and infrastructure.
- **Identify the needs for supporting laboratory data to interpret results from observatories and missions**
  - Identify and prioritize the needs for interpretation of data from current and future observatories and missions.
  - Identify the corresponding requirements for laboratory and theoretical research to support those needs.
  - Identify workforce and infrastructure needs.
- **Identify the national resources that can be brought to bear to satisfy those needs**
  - Identify national resources and interagency synergies (e.g., DOE, DOD, NIST, …) that are not being exploited at present.
  - Identify ways in which existing resources can be used more efficiently.
  - Identify the specific areas that might benefit from targeted additional investments.
  - Consider how resources for laboratory astrophysics should be integrated into the planning and operation phases of observatories and missions.
- **Consider new approaches or programs for building the requisite databases**
  - Identify the database gaps, both nationally and internationally.
  - Define database requirements that would enhance interpretation of astronomical observations.
  - Identify new modalities of support (e.g., “Centers” for laboratory astrophysics and databases).

The Taskforce is requested to report its initial findings to the AAAC in mid-2023, with a final report to be delivered by early 2024. In accordance with Federal Advisory Committee (FACA) rules, the report will be discussed and approved by the AAAC at a public meeting before formal transmittal to the agencies.

We appreciate your effort in establishing this taskforce. Its deliberations and findings will inform the agencies on the strategic needs for federal support of laboratory astrophysics and contribute to the agencies' planning activities. The formation of the ad hoc taskforce does not imply any commitment by the agencies to provide specific funding for laboratory astrophysics.

We look forward to working with you in this important endeavor. The points of contact for each agency are listed below.

Sincerely,

Debra Fischer

Debra A. Fischer
Director, Division of Astronomical Sciences
Directorate for Mathematical and Physical Sciences
NSF

23 August, 2022

Date

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Mark Clampin
Director, Astrophysics Division
Science Mission Directorate
NASA Headquarters

Date

Agency Points of Contact

For NSF: Dr. Harshal Gupta
Program Officer
Division of Astronomical Sciences
Directorate for Mathematical and Physical Sciences
Phone: 703-292-5039; Email: hgupta@nsf.gov

For NASA: Dr. William B. Latter
Lead Laboratory Astrophysics Discipline Scientist
Astrophysics Division
Science Mission Directorate
Phone: 202-358-0734; Email: william.b.latter@nasa.gov